PENDING CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

1. (Currently Amended) A method for offset time tracking in a non-negligible multipath spacing environment, the method comprising:

> receiving signals in an environment encompassing an antenna diversity system,
>
>> the antenna diversity system comprising a plurality of antennas each
>>
>> transmitting a modulated signal;
>
> demodulating a first modulated signal of the plurality of modulated signals into a
>
>> first demodulated signal in response to a first offset, a first data
>>
>> despreading sequence, and a first pilot estimate;
>
> demodulating a second modulated signal of the plurality of modulated signals into
>
>> a second demodulated signal in response to a second offset, a second data
>>
>> despreading sequence, and a second pilot estimate, wherein the second
>>
>> data despreading sequence is different from the first data despreading
>>
>> sequence;
>
> generating a first error signal for the first demodulated signal in response to
>
>> sampling of a pilot signal, associated with the first modulated signal, a
>>
>> predetermined time prior to the first offset and a predetermined time
>>
>> subsequent to the first offset;
>
> generating a second error signal for the second demodulated signal in response to
>
>> sampling of a pilot signal, associated with the first modulated signal, a

predetermined time prior to the second offset and a predetermined time

subsequent to the second offset;

generating a first updated offset in response to the first time error signal; and

generating a second updated offset in response to the second time error signal.

2. (Original) The method of claim 1, further comprising combining the first

demodulated signal and the second demodulated signal to form a combined signal that is

substantially equivalent to the main data signal.

3. (Original) The method of claim 2, wherein the step of combining comprises

demultiplexing the first and the second demodulated signals.

4. (Original) The method of claim 1, wherein the first and the second modulated

signals are alternating portions of a main data signal.

5. (Original) The method of claim 1, wherein the first updated offset is generated

with a first time tracking loop and the second updated offset is generated with a second

time tracking loop.

6. (Original) The method of claim 1, further comprising demodulating further

received signals using the first updated offset and the second updated offset.

7. (Currently Amended) A method for offset time tracking in a non-negligible

multipath spacing environment, the method comprising:

receiving signals in an environment encompassing an antenna diversity system,

the antenna diversity system comprising a plurality of antennas each

transmitting a modulated signal from a plurality of modulated signals;

4

demodulating a first modulated signal of the plurality of modulated signals into a

first demodulated signal ~~in response to~~ using a first offset <u>and a first data</u>

<u>despreading sequence</u>;

demodulating a second modulated signal of the plurality of modulated signals into

a second demodulated signal ~~in response to~~ using a second offset <u>and a</u>

<u>second data despreading sequence wherein the second data despreading</u>

<u>sequence is different from the first data despreading sequence</u>;

determining a first energy magnitude of the first demodulated signal a

predetermined time prior to the first offset;

determining a second energy magnitude of the first demodulated signal a

predetermined time subsequent to the first offset;

generating a first error signal for the first demodulated signal in response to a

difference between the first and the second energy magnitudes;

determining a third energy magnitude of the second demodulated signal a

predetermined time prior to the second offset;

determining a fourth energy magnitude of the second demodulated signal a

predetermined time subsequent to the second offset;

generating a second error signal for the second demodulated signal in response to

a difference between the third and fourth energy magnitudes;

generating a first updated offset in response to the first error signal; and

generating a second updated offset in response to the second error signal.

8.   (Original) The method of claim 7, wherein the predetermined time prior to the

first offset is half a chip time and the predetermined time subsequent to the first offset is

half a chip time.

9.   (Original) The method of claim 7, further comprising combining the first and

second demodulated signals into a single data signal by demultiplexing the first and

second demodulated subset signals through a data demultiplexer.

10.   (Currently Amended) An offset time tracking apparatus that tracks a time offset in

a non-negligible multipath spacing environment, the apparatus comprising:

        a first timing offset that provides an indication of [[the]] a first modulated signal

                location;

        a second timing offset that provides an indication of [[the]] a second modulated

                signal location;

        a first demodulator, coupled to for demodulating the first modulated signal using

                a first data despreading sequence and the first timing offset, that generates

                to generate a first demodulated signal, wherein the first demodulator

                operates in an environment encompassing an antenna diversity system, the

                antenna diversity system comprising a plurality of antennas each

                transmitting a modulated signal;

        a second demodulator, coupled to for demodulating the second modulated signal

                using a second data despreading sequence and the second timing offset,

                that generates to generate a second demodulated signal, wherein the

                second demodulator operates in the environment encompassing the

antenna diversity system and wherein the second data despreading

sequence is different from the first data despreading sequence;

means for generating a first error signal for the first demodulated signal, the

means for generating coupled to the first timing offset and the first

modulated signal;

means for generating a second error signal for the second demodulated signal, the

means for generating coupled to the second timing offset and the second

modulated signal;

a first time tracking loop coupled to the means for generating the first error signal,

the first time tracking loop generating an updated first timing offset that is

used for subsequent demodulation of the first modulated signal; and

a second time tracking loop coupled to the means for generating the second error

signal, the second time tracking loop generating an updated second timing

offset that is used for subsequent demodulation of the second modulated

signal.

11.   (Original) The apparatus of claim 10, further comprising a data demultiplexer

coupled to the first and the second demodulated signals, the data demultiplexer

combining the first and the second demodulated signals.

12.   (Original) The apparatus of claim 10, wherein the means for generating the first

error signal further comprises:

means for determining a prior energy level of the first demodulated signal a

predetermined time prior to the first timing offset;

means for determining a subsequent energy level of the first demodulated signal a

predetermined time subsequent to the first timing offset; and

means for combining the prior and the subsequent energy levels to generate the

first error signal.

13. (Original) The apparatus of claim 10, wherein the means for generating the

second error signal further comprises:

means for determining a prior energy level of the second demodulated signal a

predetermined time prior to the second timing offset;

means for determining a subsequent energy level of the second demodulated

signal a predetermined time subsequent to the second timing offset; and

means for combining the prior and the subsequent energy levels to generate the

second error signal.

14. (Currently Amended) In a mobile station receiver, a method for offset time

tracking in a non-negligible multipath spacing environment, the method comprising:

receiving signals in an environment encompassing an antenna diversity system,

the antenna diversity system comprising a plurality of antennas each

transmitting a modulated signal;

demodulating a first modulated signal of the plurality of modulated signals into a

first demodulated signal in response to a first offset, a first data

despreading sequence, and a first pilot estimate;

demodulating a second modulated signal of the plurality of modulated signals into

a second demodulated signal in response to a second offset, a second data

despreading sequence, and a second pilot estimate, wherein the second

data despreading sequence is different from the first data despreading

sequence;

generating a first error signal for the first demodulated signal in response to

sampling of a pilot signal, associated with the first modulated signal, a

predetermined time prior to the first offset and a predetermined time

subsequent to the first offset;

generating a second error signal for the second demodulated signal in response to

sampling of a pilot signal, associated with the first modulated signal, a

predetermined time prior to the second offset and a predetermined time

subsequent to the second offset;

generating a first updated offset in response to the first time error signal; and

generating a second updated offset in response to the second time error signal.

15.　(Currently Amended) A method for offset time tracking in a non-negligible

multipath spacing environment, the method comprising:

receiving signals in an environment encompassing an antenna diversity system,

the antenna diversity system comprising a plurality of antennas each

transmitting a modulated signal;

demodulating each of the plurality of modulated signals into a plurality of

demodulated signals, each signal being demodulated in response to using

an offset, a data despreading sequence, and a pilot estimate, wherein the

data despreading sequence is different for each of the plurality of

modulated signals;

9

generating a plurality of error signals, one for each of the plurality of demodulated

signals, each in response to sampling of a pilot signal associated with each

modulated signal a predetermined time prior to the offset and a

predetermined time subsequent to the offset; and

generating a plurality of updated offsets, each in response to each of the plurality

of time error signals.

16.   (Original) The method of claim 15, wherein the antenna diversity system is a

receive antenna diversity system.

17.   (Currently Amended) A method for offset time tracking in a non-negligible

multipath spacing environment, the method comprising:

receiving signals in an environment encompassing an antenna diversity system,

the antenna diversity system comprising a plurality of antennas each

transmitting a modulated signal of a plurality of modulated signals and

having an associated pilot signal;

generating a demodulated signal in response to from a modulated signal of the

plurality of modulated signals [[,]] using an offset, a data despreading

sequence, and a plurality of pilot signal estimates, wherein the data

despreading sequence is different for each of the plurality of modulated

signals;

generating an early despread signal for the demodulated signal in response to a

sampling of an associated pilot signal prior to the offset and a pilot

despreading sequence;

accumulating the early despread signal over a predetermined chip interval to generate a first symbol;

generating a first sum for the early despread signal that is made up of the first symbol and a delayed first symbol;

generating a second sum for the early despread signal that is made up of the first symbol and a negative of the delayed first symbol;

generating a first error signal in response to a sampling of the first and second sums for the early despread signal;

generating a late despread signal for the demodulated signal in response to a sampling of the associated pilot signal subsequent to the offset and the pilot despreading sequence;

accumulating the late despread signal over the predetermined chip interval to generate a second symbol;

generating a first sum for the late despread signal that is made up of the first symbol and a delayed first symbol;

generating a second sum for the late despread signal that is made up of the first symbol and a negative of the delayed first symbol;

generating a second error signal in response to a sampling of the first and second sums for the late despread signal;

generating an average error signal in response to a weighted sum between the first and second error signals; and

generating an updated offset in response to the average error signal.

18. (Original) The method of claim 17, wherein the predetermined chip interval is 256 chips.

19. (Original) The method of claim 17, wherein the sampling of the first and second sums for the early and late signals is performed at 512 chip intervals.

20. (Currently Amended) A mobile station receiver that is configured to offset time tracking in a non-negligible multipath spacing environment, the mobile station receiver comprising:

a processor;

memory in electronic communication with the processor;

instructions stored in the memory, the instructions being executable to:

demodulate a first modulated signal of the plurality of modulated signals

into a first demodulated signal in response to a first offset, a first

data despreading sequence, and a first pilot estimate, wherein the

demodulation occurs in an environment encompassing an antenna

diversity system, the antenna diversity system comprising a

plurality of antennas each transmitting a modulated signal;

demodulate a second modulated signal of the plurality of modulated

signals into a second demodulated signal in response to a second

offset, a second data despreading sequence, and a second pilot

estimate, wherein the demodulation occurs in the environment

encompassing the antenna diversity system and wherein the second

data despreading sequence is different from the first data

despreading sequence;

generate a first error signal for the first demodulated signal in response to

sampling of a pilot signal, associated with the first modulated

signal, a predetermined time prior to the first offset and a

predetermined time subsequent to the first offset;

generate a second error signal for the second demodulated signal in

response to sampling of a pilot signal, associated with the first

modulated signal, a predetermined time prior to the second offset

and a predetermined time subsequent to the second offset;

generate a first updated offset in response to the first time error signal; and

generate a second updated offset in response to the second time error

signal.